MIT's Oldest and Largest Newspaper

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The Tech
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Thursday, November 8, 2018

WEATHER, p. 2

THU: 53°F | 37°F
Mostly Sunny

FRI: 52°F | 49°F
Partly Cloudy

SAT: 53°F | 33°F
Partly Sunny

SHINJINI GHOSH—THE TECH

An inflatable 'Vote-a-saurus' dinosaur was put up in Lobby 7 to encourage students to vote in the Nov. 6 midterm elections.

Visa issues block international teammates from iGEM event

Travel ban causes "self-censorship," team mentor says

By Sheila Baber
NEWS EDITOR

Several international students were unable to attend this year's Giant Jamboree, the culminating event of the International Genetically Engineered Machine (iGEM) competition, Oct. 24–28 due to visa issues relating to their nationality. iGEM is a synthetic biology competition that originated from an MIT course offered in the 2003 Independent Activities Period.

The students who could not take part in the event, which was held at Hynes Convention Center, were from Iran and Lebanon, according to Ivan Istomin, an advisor for the team from École Polytechnique Fédérale de Lausanne in Switzerland, in an interview with *The Tech*.

Iran is a country restricted under Trump's executive order, with only student and exchange visitor visas granted to its citizens. Lebanon is not formally under the travel ban. The U.S. Supreme Court upheld the legality of the third and current iteration of the executive order this June.

According to Istomin, the students were denied permission from the U.S. Consular officers to obtain the necessary visas and were instructed to obtain proof of "hardship" in order to receive a waiver. Hardship is nebulously described in the U.S. Citizenship and Immigration Services website as the detrimental consequences resulting from the denial of a visa. Factors for "extreme" hardship include familial separation and health issues.

Istomin also said that the Executive Vice President of iGEM headquarters, Meagan Lizarazo, wrote in an email to the students that iGEM is "not an entity in a position to petition for hardship" and that "this situation has arisen in the past."

"We have one of the most international schools in the world... And every year it becomes more and more complicated to represent this multiculturalism, this diversity on campus in the team that we are working with," Istomin said. "[The travel ban] forces students to [practice] self-censorship. Imagine an Iranian or a Syrian student who joined a team knowing that they would not be able to make it to Boston given the current political situation."

During the closing ceremony of the Giant Jamboree, iGEM President Randy Rettberg said, "We've had teams that have had problems with visas getting into this country — some of those have been very sad. And some of them affected quite a few members of the teams. My heart goes out to those iGEM teams and students."

Istomin said in the interview that while it is unfortunate that some of these organizations are physically constrained by where they are, groups such as iGEM are taking a "constructive step towards a compromise solution" by recognizing these issues.

In the grander scheme, some members of the academic community have started a movement to boycott international conferences held in the U.S. following the first iteration of Trump's executive order. Several technology conferences and summits, such as the formerly New Orleans-based Web Summit conference Collision, have already moved to Canada and other countries in light of the political climate in the U.S.

Folk Dance Club de-recognized by ASA due to lack of students

Mostly composed of alumni, community members

By Kaitlyn Hennacy
ASSOCIATE NEWS EDITOR

The MIT Folk Dance Club, which sponsored Israeli, contra, and international dancing groups for the past sixty years, is no longer recognized as a student group by the Association of Student Activities as of Nov. 1.

Without the status of a student group, the club no longer has the privilege of reserving spaces on campus or officially using the MIT name.

The club was de-recognized because it did not meet the requirement that at least 50 percent of its members must be students, Becca Black G wrote on behalf of the ASA executive board in an email to *The Tech*.

The different dance groups operated independently but shared equipment, according to Amitai Lipton, coordinator of the Israeli folk dance group, in an interview with *The Tech*. The Israeli group had more than 500 people on its mailing list and a weekly attendance of 50 to 100 dancers. Most of those dancers were community members, MIT alumni, faculty, or staff.

However, only a handful of students were involved, according to Rina Wagman, one of the non-MIT-affiliated leaders of the Israeli folk dance group, in an interview with *The Tech*.

The ASA voted to de-recognize the Folk Dance Club Oct. 26. It only recently became aware that the club did not have a 50 per-

Folk Dance, Page 2

KEVIN LY—THE TECH

The international folk dancing group dances to Eastern European music as members organized in lines and circles in La Sala Oct. 28.

Vassar Street residence foundation nearly done

Dorm to be completed and occupied in 2020

By Rujul Gandhi

Work on the foundation for a new undergraduate residence hall on Vassar Street is nearing completion, and work on its superstructure — the construction above ground — is scheduled to start this week.

The construction site was previously the West Garage parking facility, which was demolished earlier this year. It is bordered on the east by the Metropolitan Warehouse and on the left by the Pacific Street crossing. Construction began in April 2018, according to Sonia Richards, program manager for Campus Construction in the Department of Facilities, in an email to *The Tech*.

"We're completing the foundation work and underground utilities," Richards said in an interview with *The Tech*. "In another week or so, we're going to start doing the superstructure, which will start with the ground floor, and then we'll start moving up to the other floors." The completed building will have five floors.

The Vassar Street residence hall is projected to be completed in the summer of 2020 and occupied that fall. The concrete frame of the building will be constructed this winter.

The construction plan also includes adding green spaces — such as a plaza and courtyard — as well as benches and lighting along Vassar Street. Furthermore, the nearby Pacific Street crossing will be widened.

According to MIT's Capital Projects website, the Vassar Street residence is expected to have 450 beds. The rooms will be singles and doubles arranged in clusters, and the design of the stairways and common areas is meant to facilitate interaction between the clusters. There will also be a dining hall and kitchen.

IN SHORT

MITHenge will take place tomorrow at 4:18 p.m. along the Infinite Corridor. Remember to take proper safety precautions when observing this astronomical event!

Spring housing forms are due Nov. 25 and are available at myhousing.mit.edu.

There will be **no classes next Monday, Nov. 12**, for the Veterans Day holiday.

Interested in **joining** *The Tech*? Stop by for dinner Sunday at 6 p.m. or email *join@tech.mit.edu.* **Send news and tips to *news@tech.mit.edu.***

PLAYING WITH THE HIVE MIND
The Media Lab's BeeMe Project took place Oct. 31.
SCIENCE, p. 7

A PLAY ABOUT MOTHERHOOD
Six mothers fight over three children.
ARTS, p. 16

DISNEY CAN DO BETTER
A different take on *The Nutcracker*.
ARTS, p. 15

TECHNOLOGY WITH MUSIC
Damian Kulash wants to collaborate with Erik Demaine. **ARTS, p. 16**

ELECTIONS AND TECHNOLOGY
Experts presented on technology's impact on the political landscape.
SCIENCE, p. 6

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WEATHER

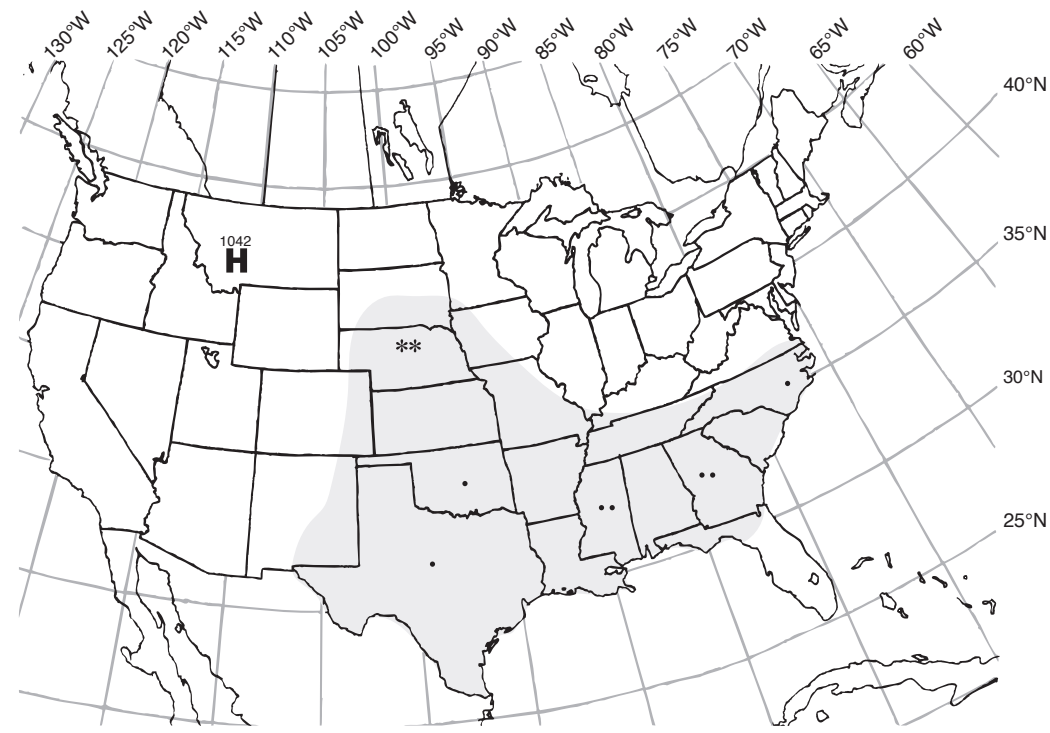
Another week, another rainy nor'easter

By Jordan Benjamin
STAFF METEOROLOGIST

The unsettled weather pattern of late is poised to advance Boston's unusually wet autumn as yet another nor'easter races up the coast Friday night. Although it's still too warm for snow, the fast moving low pressure system will bring a quick burst of about an inch of rain to open the weekend. This system, combined with another stronger system early next week, could bring an additional 2–4 inches of rain pushing Boston to near 5 inches above normal for the season. Elsewhere, these systems will also dump the first significant interior snows of the cool season in the northern U.S., continuing what has been a rather unsettled transition to winter. In between nor'easters, we can expect cool sunny days under high pressure with high temperatures in the 40s °F and low temperatures around freezing.

Extended Forecast

Today: Mostly sunny. High around 53°F (12°C). Winds west at around 10 mph.
Tonight: Mostly clear. Low around 37°F (3°C). Light north winds.
Tomorrow: Partly cloudy, then rain overnight. High around 52°F (11°C). Low around 49°F (9°C). East winds at 10-15 mph.
Saturday: Partly sunny. High around 53°F (12°C). Low around 33°F (1°C).
Sunday: Sunny. High around 42°F (6°C).



Situation for Noon Eastern Time, Thursday, November 8, 2018

Weather Systems	
H	High Pressure
L	Low Pressure
§	Hurricane

Weather Fronts	
	Trough
	Warm Front
	Cold Front
	Stationary Front

Precipitation Symbols	Snow	Rain
Showers	* ▽	• ▽
Light	*	•
Moderate	**	••
Heavy	⁂	•••

Other Symbols	
	Fog
	Thunderstorm
	Haze

Compiled by MIT Meteorology Staff and *The Tech*

E38, E39 exteriors restored as part of Kendall Sq. Initiative

E38 will house Admissions, and E39 will contain grad student residence tower and auditorium

By Rujul Gandhi

Exterior restorations of buildings E38 and E39, which are currently undergoing renovations as part of Site 4 of the Kendall Square Initiative, are almost complete.

Site 4 construction began in January 2017 and is set to complete in summer 2020 with target occupancy beginning the following fall. E38 will contain ground-floor retail space; the Admissions office on the second floor; and a new Innovation and Entrepreneurship Hub on the five upper floors, according to MIT's Capital Projects website.

E39 will include retail and office space, a graduate student residence tower with 454 housing units, and a 200-seat auditorium called the Forum.

Envisioned to make Kendall Square a gateway into MIT, the Kendall Square Initiative is a collection of six construction sites. The construction at Site 4 is a combination of renovation and new construction. "The exterior of E38 and E39 had minor alterations, but basically we are restoring it back to its original design," Sonia Richards, program manager for Campus Construction in the Department of Facilities, said in an interview with *The Tech*.

Construction is running according to schedule, Richards said. Work is currently underway on the eighth and ninth floors of the graduate student tower. The completed tower will have thirty floors.

MIDTERM ELECTION RESULTS

The Massachusetts general election took place Tuesday as part of the 2018 U.S. midterm elections. Democratic senator Elizabeth Warren was re-elected for a second six-year term, while incumbent Governor Charlie Baker (R) defeated Jay Gonzalez (D) to win his second term.

Boston City Councilor Ayanna Pressley (D) ran unopposed in the 7th Congressional District, which includes Cambridge, and will be the first black woman to serve in Congress from Massachusetts.

Question 3 on the ballot, which concerned a previous statewide referendum passed in 2016 that prohibited discrimination on the basis of gender identity in places of public accommodation, was upheld.

Question 2, which proposed to create a committee to promote a constitutional amendment restricting the influence of money in politics, was also passed. Question 1, which would have limited the number of patients that can be assigned to a registered nurse in healthcare facilities, did not pass.

Folk Dance Club still without permanent home

Folk Dance, from Page 1

cent student membership. "This is not a process without precedent; past groups have also been derecognized after a lack of student involvement has been brought to the ASA's attention, and the decision is made after following standard ASA protocols," Black wrote.

Approximately 50 student groups will be de-recognized by the ASA by the end of this year due to not complying with guidelines. According to Black, many of these were de-recognized because they failed to complete the annual spring re-recognition process.

At the last meeting of the Israeli dance group Oct. 31, members expressed their appreciation for the club and regretted that it would no longer be held at MIT.

"It uses my brain a lot, but a different part of my brain. Sometimes I come up with theorems here because I'm less stressed," David Karger, EECS professor and a member of the Israeli dance group since 1983, said in an interview with *The Tech*.

More than 500 people signed a petition in support of the Folk Dance Club. Comments included personal stories about how the club impacted its members.

"I was an undergraduate here, and MIT folk dancing had a great impact on my life, my connection with the community, and the formation of a personal interest that I have continued past undergrad," Brian L. Ross '11 wrote in the petition.

"MIT was famous not only for its intellectual offerings, but for the way it enriched generations of students from around the world in cultural experiences. It saddens me to think of this school treasure coming to an end," Joan Hantman, a previous coordinator of the Israeli dance group, wrote.

The deep impression that the club leaves on its membership and community may contribute to its low student ratio. "Those current students who do come, become enthusiastic, learn how to dance, etc., typically graduate, and then [it] actually [counts] against us if they continue to participate. It's a real Catch 22," Janet Baker, co-coordinator of the international dance group, wrote in an email to *The Tech*.

After the Folk Dance Club's de-recognition, the Israeli, contra, and international dance sub-groups are looking for new venues. The Israeli dance group has temporarily rented a location in Brookline but is looking for a place closer to campus, Sara Timoner, one of the group's leaders, wrote in an email to *The Tech*.

Changing locations will place a financial burden on members. "Through MIT's generosity, we haven't charged admission for over 50 years. Moving to Brookline means we have to pay a rent, so we have to charge admission," Lipton said.

The dance groups are also considering seeking recognition as an alumni group or merging with other student groups, Timoner wrote.

Have something to say?
Write **opinion** for *The Tech*!
opinion@tech.mit.edu

ADVICE

Advising the advisor

Auntie Matter on what MIT students should do with their lives

By Auntie Matter

If you have questions for Auntie Matter, please submit them at tinyurl.com/AskAuntieMatter. Questions have been edited for length, clarity, and content.

This week, Auntie will answer a question from yet another professor, this one at length.

Dear Auntie Matter,

My first-year advisees think I am crazy. They all want to be Course 6. I think they should consider other majors. They look at me as if I am crazy because I give them this advice:

- *Hordes from across the globe are going into coding-related fields. There may not be enough growth to provide employment for them — and certainly not in countries with high cost of living.*
- *You will work in a cubicle for longer than you should. All of the mid-level management jobs are filled with the wave that will precede you. They are roughly the same generation. Your possibilities for promotion will be blocked.*
- *Much of coding and cool AI jobs (at the just-graduated level) are going to be replaced by — you guessed it — AI. What coding there is left will be part of a service economy.*
- *Facebook, Google, Twitter, etc. won't continue to be cool places to work. The parking lot will be filled with family SUVs, middle-aged employees will be covered with out-of-fashion, embarrassing, and passé tattoos. All will be frustrated because their great ideas washed away like tears in the rain.*
- *Imagine yourself 15 years from now. Are you going to be able to maintain an interesting conversation?*

So, am I crazy?

— Can't Convince Kiddos not to Code

Dear Can't,

There's a lot to unpack here. First — why are you looking for validation from Auntie Matter, who, for all you know, is just three MIT students inside a trench coat? Perhaps, in reading Auntie's previous columns, you have come to suspect that she agrees with you. You're correct to think that Auntie believes not everyone should be Course 6. She recently wrote on this very topic! Auntie likes to picture you as a disgruntled HASS professor, and Auntie is a disgruntled HASS student, so we have a lot in common. However, Auntie cannot agree with your approach. She thinks your advice conflates major and career, which ironically is exactly what you accuse your students of doing. Furthermore, your attitude is very apocalyptic. Do you really think students who learn to code will be both boring and replaced in the job market by AI, or is this just rhetoric?

You have the same flawed view as your students that major is career. Instead of encouraging the freshmen you advise to change their major to avoid a certain career path, you should probably be telling them to explore their intellectual interests. Students should be disabused as quickly as possible of the notion that their major choice determines their career. While of course it has an influence, the idea that major is determines career is simply untrue, and you as a freshman advisor should not perpetuate it. Furthermore, if students actually do partake of a broader education, pursuing their interests, instead of a narrow one focused on one career path, they will have the flexibility to work more than one job, which would resolve your concern about insufficient coding job opportunities.

Speaking of job opportunities, you seem to have conflated a few things in your criticism of future jobs at tech companies and in offices. A lot of MIT students will work in companies, all will hopefully live into middle age and beyond, and many will have families. None of these things — which amount to living a normal life for many people — necessarily make these students corporate drones who will never have an interesting thought in their lives. What do you want MIT students to do if not work in a company? Academia? Government? Organic farming?

There is a valid point underlying your concern about cubicles and corporations. That environment could be stultifying, but many people will work there, and it's possible to lead an interested and engaged life while working in a corporate environment. There is more than one sort of corporate environment, and even in the worst environments, our inner intellectual resources can be sustaining.

Instead of telling your students not to work a specific kind of job, encourage them to be a specific kind of person — one who is awake in the world. Perhaps they could be interested and engaged with politics, or community service, or the arts. Encouraging your students to develop as people and as citizens might be more effective than discouraging them from studying computer science.

Finally, Auntie notices that for MIT students there is often an expectation that our careers should be creative, lucrative, ethical, and our main source of personal fulfillment. This is an unreasonable expectation, and one that your question seems to reflect. It would be okay if some of your advisees worked tech jobs, went home, loved their families, and led ordinary lives. For many people this is a dream. Not all MIT students need to be billionaires, married to their work, and saving the planet. It is enough that they be good citizens, interested and interesting, and engaged with the world around them.

ARTS WANTS YOU

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OPINION OPINION OPINION

GUEST COLUMN

The next generation of bioengineers is not allowed into the U.S.

America's travel ban prevents science outreach competitions from being inclusive to all students

By Rohan Thakur

The 2018 International Genetic Engineered Machine (iGEM) competition concluded two weeks ago. What sounds like an odd cross between Jurassic Park and paper mâché volcanoes is arguably one of the most successful science outreach initiatives for bioengineering. iGEM challenges college and high school students to don lab coats and run real, cutting edge biology experiments. This year, competitors engineered biology to make biosensors for bomb detection, tools for water remediation, and cancer immunotherapies.

Even more impressively, veterans of the competition have gone on to be leaders in their fields, both in academia and in the private sector. For example, the very first venture funded biotechnology company, Gingko Bioworks, was born from iGEM. It's amazing that such opportunity in this growing field of synthetic biology is offered to young students just starting their careers.

Unfortunately, this opportunity is being ripped out of the hands of some students because of their country of origin. Due to the U.S.'s travel ban, many teams are unable to send their full team to the iGEM final competition in Boston. This hinders the ability of those teams to perform their best. More profoundly, this signals to the entire iGEM community that not all students are welcome in the field. If iGEM is to truly serve its mission of making synthetic biology research available to anyone, it must move outside of the U.S.

Competitions like iGEM have an impact that extends far beyond merely exposing students to the field. My own trajectory in science was heavily influenced by similar science competitions. As a high school student, I built a DIY lab in my garage to design earthquake resistant housing and to run structural stability experiments. Through competitions like Intel ISEF, ISWEEEP, and MILSET, I had the opportunity to present my results to scientists and mechanical engineers. This experience solidified my passion for research and was the first moment that I began to see myself as a scientist. Even to this day, I look back to this high school experience as a source of motivation whenever I encounter an obstacle in my lab work. Knowing that I will carry that experience throughout my career as a scientist, I worry what experiences we are creating for the iGEM competitors unable to enter the U.S. Instead of receiving encouragement and affirmation that they belong in science, the next generation of bioengineers are being told that the American scientific community does not value them. While the travel ban is (hopefully) a temporary policy, the affected competitors will likely carry this psychological trauma throughout their scientific careers.

From my conversations with an affected team, it is clear that this issue is known to the organizers of iGEM and that they recognize a large number of teams have been affected. The team I spoke to had multiple students who could not attend the competition due to the travel ban. Their mentors indicated that the judges had no idea why the team was missing students and consequently, they were worried that this would reflect poorly on them. Given that this could adversely affect a team's performance in future competitions, I worry deeply that recruitment for future iGEM teams could be biased against students from affected countries. I also have no doubt that the ramifications of this exclusion will extend beyond the affected students. To the graduate student mentors, the sponsoring faculty, or the fellow students who compete beside these excluded students, how can you possibly view the U.S. as inclusive and inviting to all scientists? Potential American graduate students, postdocs, or even faculty may rethink their academic career plans considering this injustice.

Despite the gravity of this issue, the solution is simple. iGEM needs to be hosted in a country that allows any qualifying student to attend. Although iGEM has historic roots with MIT, it is separately organized by the iGEM Foundation, an independent nonprofit organization. iGEM has independently secured funding from a variety of sponsors and has the profile to retain them if they relocate to another university abroad. When asked if the organizers would consider such a move, they stated that they had this in mind, but that they were contractually obligated with Harry Hynes Convention Center for 2019 and 2020. However, the travel ban was likely not in place when the iGEM Foundation initially made this reservation, and the exclusion of students could be grounds to exit the contract.

To be clear, I do not believe that the current administration's immigration policy reflects the American scientific community's view towards immigrants. MIT, among countless other universities, have directly commented that the travel ban does not reflect their values and that they are committed to supporting the needs of affected students. As an American immigrant myself, I am confident our country's policies will return to reflect the true ideals of America. Until then, hosting iGEM within the U.S. will only discourage students affected by the travel ban and undermine the mission of inclusion that American universities are committed to.

Rohan Thakur is a first-year PhD student in MIT's Health Sciences and Technology Program.

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How technology impacts the democratic process

Experts speak at Elections and Technology symposium

Elections and Technology

Democracy, Citizenship, and Technology Colloquium Series

Bartos Theater

Nov. 1, 2018

By Eli Sanchez

A host of issues plaguing the United States' democratic institutions suddenly and unexpectedly came to the forefront of the country's political dialogue in the wake of the 2016 national election. Concerns about the vulnerabilities of voting systems and political parties, in addition to the proliferation and dissemination of false information via social media, now plague citizens as they attempt to navigate a rapidly changing political landscape.

> **Voting machines, though not connected to the internet, are nonetheless vulnerable to physical tampering.**

These new specters in civic life all have one common thread: they were enabled by the development and of new, often esoteric technologies and the integration of these technologies into the electoral process and into people's everyday lives. And despite the extensive coverage they receive, their impacts on U.S. democracy and the mechanisms by which they effect those impacts are still unclear, especially to the layman.

To help elucidate the nature of these complex issues, the MIT programs in Anthropology, History, and Science, Technology and Society (STS) invited a multidisciplinary panel of experts specializing in topics relating to the interaction of emerging technologies with society and government to speak about their work to interested attendees. The symposium, entitled *Elections and Technology*, was held in Bartos Theater and was free and open to the public.

On the panel was Dan Wallach, Professor of the systems group at Rice University's Department of Computer Science; Daniel Kreiss, Associate Professor and Director of the School of Media and Journalism at the University of North Carolina, Chapel Hill; and Moon Duchin, Associate Professor of Mathematics at Tufts University and Director of the Metric Geometry and Gerrymandering Group (MGGG). In the first hour, each panelist presented for 15 minutes on aspects of their research pertinent to the symposium's theme.

Dan Wallach spoke first about the vulnerabilities of technologies associated with the voting system. Voter registration databases are connected to the internet, making it possible for hackers to influence them in a partisan way by causing damage. And voting machines, though not connected to the internet, are nonetheless vulnerable to physical tampering. Wallach shared an amusing, though troubling anecdote in which Defcon participants were able to easily manipulate decommissioned voting machines at the annual computer hacking convention.

Wallach concluded by describing several voting and vote-counting procedures that could be adopted to improve the security of voting systems. Casting votes on paper ballots would eliminate the vulnerabilities associated with voting machines, while machines could be used to scan the papers and tally the votes to enable swift and accurate counting. Then, to establish confidence that the count is correct, risk-limiting audits could be performed in which a random subset of the electronic tallies would be double-checked with the corresponding paper ballots and a margin of error in the count would then be established. Additionally, advanced cryptographic techniques could be employed to give voters a "voting receipt" that they could use to verify with a third party that their vote was counted correctly without revealing for whom their vote was cast.

Moon Duchin spoke next about her research on mathematically modeling congressional redistricting in the U.S. and using these models to identify gerrymanders. She first framed the problem mathematically, illustrating the immense combinatorial space that arises in trying to divide Pennsylvania into simple polygons with roughly equal populations. For all cases, with many simplifying assumptions, the number of valid combinations was in the trillions. She then laid out the legal guidelines for redistricting, namely that districts must have roughly equal populations, be contiguous, and respect the Voting Rights Act of 1965 (i.e., that they must be drawn in such a way as to ensure minority communities receive political representation). "I'm doing a mathematical model... and trying to make contact with political and cultural realities in very complicated ways," she said.

Duchin described a "random walk" approach used by her group to "sample from the ginormous space of possible plans" rather than enumerating them all explicitly. "In not too long... I can find the reasonable range of properties I care about," she said. Duchin then showed how her group had applied this approach to analyze the electoral map of Virginia, which recently had its House of Delegates map thrown out as a racial gerrymander by a panel of federal judges. She showed a plot with the districts arranged from "least black" to "most black" on the x-axis and the number of black constituents on the y-axis, She then superimposed the Democrat and Republican redistricting plans on the graph. She demonstrated that the Democrats' districts tended to cluster higher on the y-axis, where it was more likely that districts would be able to elect black representatives. The Republican plans tended to cluster nearer to the center of the y-axis, where the effect of the black vote was greatly reduced. "I hope that what we've done is created a tool that gives you the ability to recognize unstated design principles that went into making a map," Duchin concluded.

> **Because "likes" and "shares" enhance the exposure of posts, political actors are now compelled to generate emotionally inflammatory content that is more likely to grab the attention of users.**

Daniel Kreiss spoke last about how technology is shaping the behavior of political actors (e.g. candidates, campaigns, political parties, etc.). He began by describing three eras of civic engagement in the United States, proposed by political scientist Pippa Norris, based on the role technology played in political dialogue and campaign advertising. The first is the Labor-Intensive Era, in which political organizations were very active in directly contacting and mobilizing their constituencies and in which voter turnout was extremely high. The second, the Capital-Intensive Era, was characterized by large investments in broadcast advertising, reliance on public opinion polling and more passive modes of civic participation. In the third era, the Postmodern Era, campaigns and candidates struggled to understand and properly utilize emerging technologies, epitomized by Howard Dean's infamous scream that spelled doom for his 2004 campaign after going viral.

He then proposed a new era — the Technology-Intensive Era — based on his own research that, in conjunction with the Postmodern Era, characterizes the present-day. "In the Technology-Intensive Era, everything campaigns do now has an underlying technological, and often data component to it," Kreiss said. Using that data, political campaigns attempt to maximize potential sympathetic voters' exposure to their message. "The same message that might be coming to me through a sponsored tweet is being reinforced at my door, is being reinforced in my mailbox... is being reinforced by a canvasser that's knocking at my door." This new paradigm has given rise to a vast ecosystem of firms specializing in tech and digital data analytics that provide expertise to political parties and campaigns. In this way, the professional landscape of political campaigns has been fundamentally altered, Kreiss explained.

The Technology-Intensive Era has also resulted in the emergence of platform companies, such as Facebook and Google, as important political actors. "[These] platforms are now significant shapers of the political communication advertising infrastructure," Kreiss said. And because "likes" and "shares" enhance the exposure of posts on these platforms, political actors are now compelled to generate emotionally inflammatory content that is more likely to grab the attention of users. Kreiss concluded by suggesting that this development has led to the emergence of an era of "clickbait" advertising in political campaigning.

Though all the panelists spoke about fairly disparate topics, the common theme was evident: technology plays a pivotal role in shaping democratic institutions and how citizens engage with them. In some cases, technology introduces new problems to the electoral process, such as the vulnerabilities of electronic voting systems and the polarizing nature of platform-based political dialogue. But technology can also provide opportunities to address previously intractable problems, exemplified by Moon Duchin's work on mathematically modeling gerrymandering. This duality highlights the importance of the panelists' research: by elucidating technology's influence on the political process, we can better understand how to use it in ways that maintain the health of our democracy.

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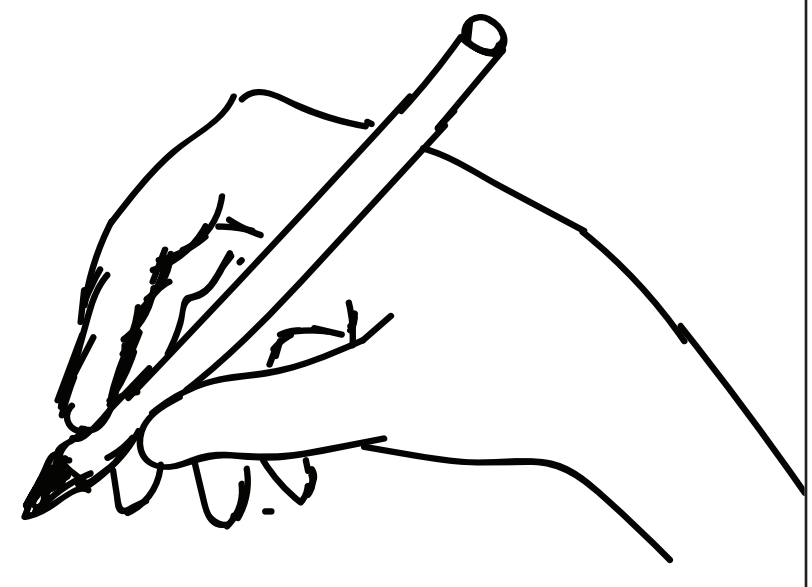


A collaborative quest

The Media Lab's BeeMe project lets users work together to defeat a self-improving AI

By Jordan Harrod and Joanne Yuan

Set in a universe threatened by a self-improving AI by the name of Zookd, BeeMe, a project by the MIT Media Lab, tasks a virtual network of players to control an actor in order to find a way to stop Zookd from overriding its built-in moral code.

The MIT Media Lab has long been home to non-sequitur social experiments, engaging the public with anything from creating a tapestry of voters to the world's first psychopath AI. However, this may be one of their most interactive and involved experiments yet. BeeMee was developed by Niccolo Pescetelli, a human psychologist working to understand the dynamics of human collective intelligence, and Dr. Iyad Rahwan, a scientist who leads the Scalable Cooperation group at the MIT Media Lab. This immersive social event invites Internet users to work together to stop Zookd from succeeding in his mission. They do so by controlling an actor, who has consented to give up their free will for the evening. The mechanism for doing so is a hive mind — participants come up with possibilities for actions and vote on them. The most popular option will be performed by an actor and live-streamed to the participants.

The project draws its inspiration from an intersection of literature, performing arts, gaming, popular culture, and YouTube streaming, and aims to break ground in previously poorly-understood areas of human dynamics and human intelligence research.

BeeMe attempts to demonstrate the dynamics of cooperative human intelligence and the influence of internet anonymity on real-life human dynamics. One of the landmarks of human intelligence at the individual level is the ability to implement long-term plans or goals and execute the necessary steps to achieve them. However, not many people have studied how human intelligence functions when people work in groups — most experiments have been much simpler than BeeMe, with participants working together to count the number of beans in a jar or perform other similarly trivial tasks. As such, Pescetelli took the lead in determining the types of information that should be collected from BeeMe, planning to analyze collective navigation, fine-grained coordinated action, and behavior dynamics.

In an interview with *The Tech* before the event, Pescetelli expected one of three outcomes: the virtual crowd would successfully implement an outlined "action plan," the crowd would defy the mission and collectively decide on a new goal, or there would be little to no planning or coordination of the crowd. One of the dynamics that interested him most was the interaction between the actor and the real world, which would be driven by the desires of the virtual crowd.

ALAN FOSTER

BeeMe's two player characters face off in Lobby 7.

More than a thousand people logged onto the event, which began at 11 p.m. on Oct. 31. Two characters were controlled by users: one by the name of Winter and the other by the name of Neuro.

The Tech followed the livestream of Neuro.

During the event, players controlled Neuro to explore their surroundings in MIT, including Lobby 10 and the area near the Student Center. They discovered that Zookd was trying to access the nuclear power facilities. After meeting in the Infinite Corridor, the two characters came to an agreement that they would work together to stop Zookd. When later given the opportunity to betray Winter, players chose to remain loyal and successfully stopped Zookd together.

In the process of this adventure, users faced some unexpected technical issues. Some users found themselves initially unable to log onto the website and others unable to participate by submitting and voting on choices. In response, Pescetelli and his team switched to a chat as their main communication channel with the users. This may have led to some confusion and frustration as some users complained that the actions performed by the actor did not always seem to match up with the top-voted choice shown on the website.

Due to the real-time consensus mechanism being an upvote/downvote system (similar to that of Reddit), Pescetelli and his team expected there to be some lag between when an idea was proposed and when a consensus was reached. However, during playtime, this did not seem to overly affect the flow of the game.

During the game, players sometimes struggled to decide on commands, some of which did not necessarily move the plot of the game's story forward. At various times within the game, the actor was requested to smash a coffee mug, sing, and lie down in the middle of a hallway. Ultimately, it seemed the players did not decide on a single cohesive strategy — however, they were still able to reach a successful conclusion.

In an email to *The Tech*, Pescetelli explained that not all the email addresses used were genuine, causing them to suspect that they were attacked by malicious accounts.

On the whole, Pescetelli was pleased with the results of the experiment: "We collected precious data that we will analyze in the next months and received many requests from users to do another performance soon in the future." Excited by their first foray into investigating cooperative human intelligence, Pescetelli and his team may further explore these uncharted waters.

Katya Bezugla

Assel Ismoldayeva—The Tech

Yiliang Li

Katya Bezugla

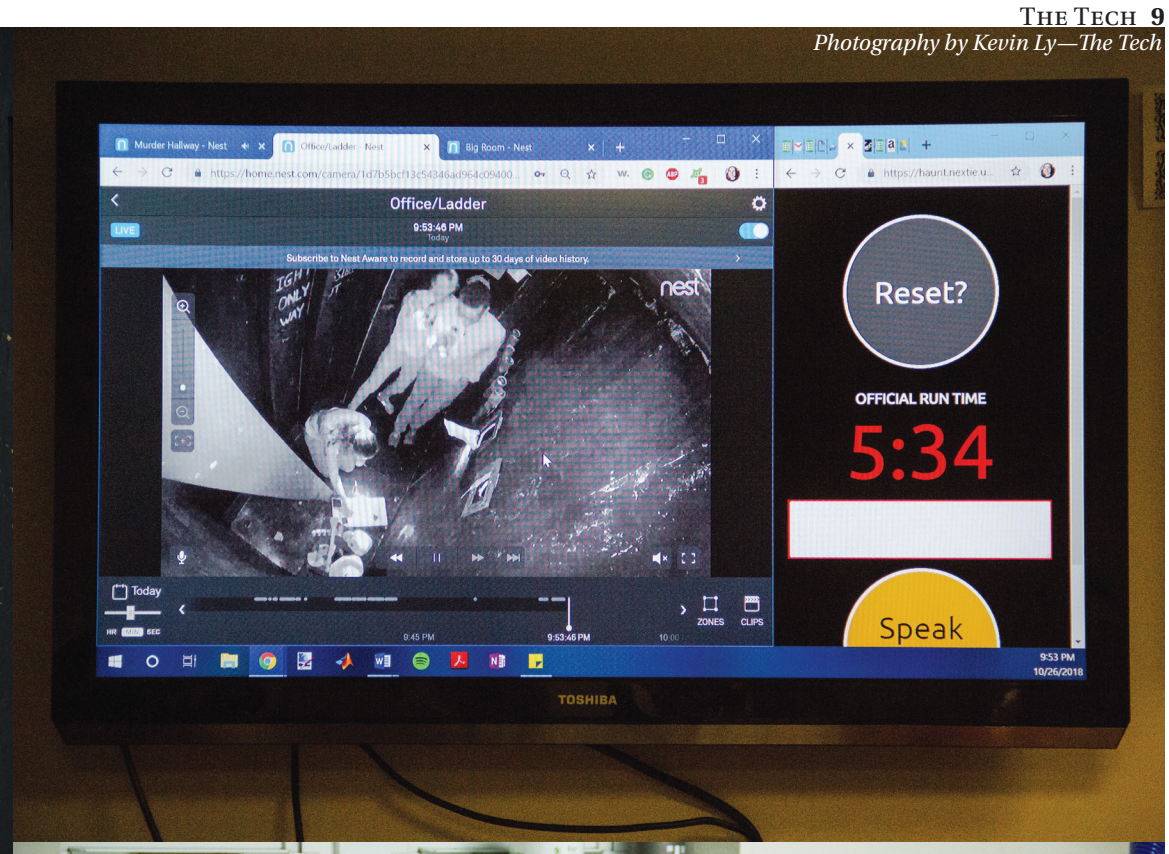
Halloween on campus

The Tech's photographers haunted the corridors of MIT to capture the spookiest moments this Halloween. The MIT student community, as well as some faculty, joined in the celebrations by showing up to their daily activities wearing costumes Oct. 31.

Assel Ismoldayeva—The Tech

Katya Bezugla

Photography by Kevin Ly—The Tech



Next Haunt

Next Haunt is a Next House-based student group that has been building and operating a haunted house-themed escape the room game in the dorm's basement every Halloween since 2014. The game draws hundreds of students each year. The Tech captured photos of both the haunted house and the behind-the-scenes efforts of the actors and producers.

FEATURE

Reflecting on MIT's third annual Title IX report

Most reported misconduct involves undergrads, most reported harassment involves faculty or staff

By Mark Goldman
STAFF REPORTER

"Official statements matter — for good or ill," wrote President Rafael Reif last week in an email to the MIT community reminding us about MIT's policies regarding harassment. The release of the Title IX reports each year shows MIT's commitment to both reducing gender-based violence and increasing transparency.

Taking a deeper look into the reported data, including the most recent Title IX report released last month, with respect to MIT and peer institutions' initiatives, highlights the impact of some of MIT's efforts and what we can do going forward.

From the three years of data, most cases of sexual misconduct, which include sexual assault, involve undergraduates, with non-affiliates making up the second largest group. Over half of sexual harassment reports were based on complaints about faculty/staff. When formal investigations have found a student responsible, MIT responds most severely to students who are found responsible for non-consensual sexual penetration, with four out of five students expelled, based on the most recent report. MIT does not report aggregate data about investigation outcomes involving faculty/staff, despite the fact that peer institutions report it and that a consensus report of The National Academies recommends it.

The data on sexual misconduct highlight the disproportionate impact it has on the undergrad community.

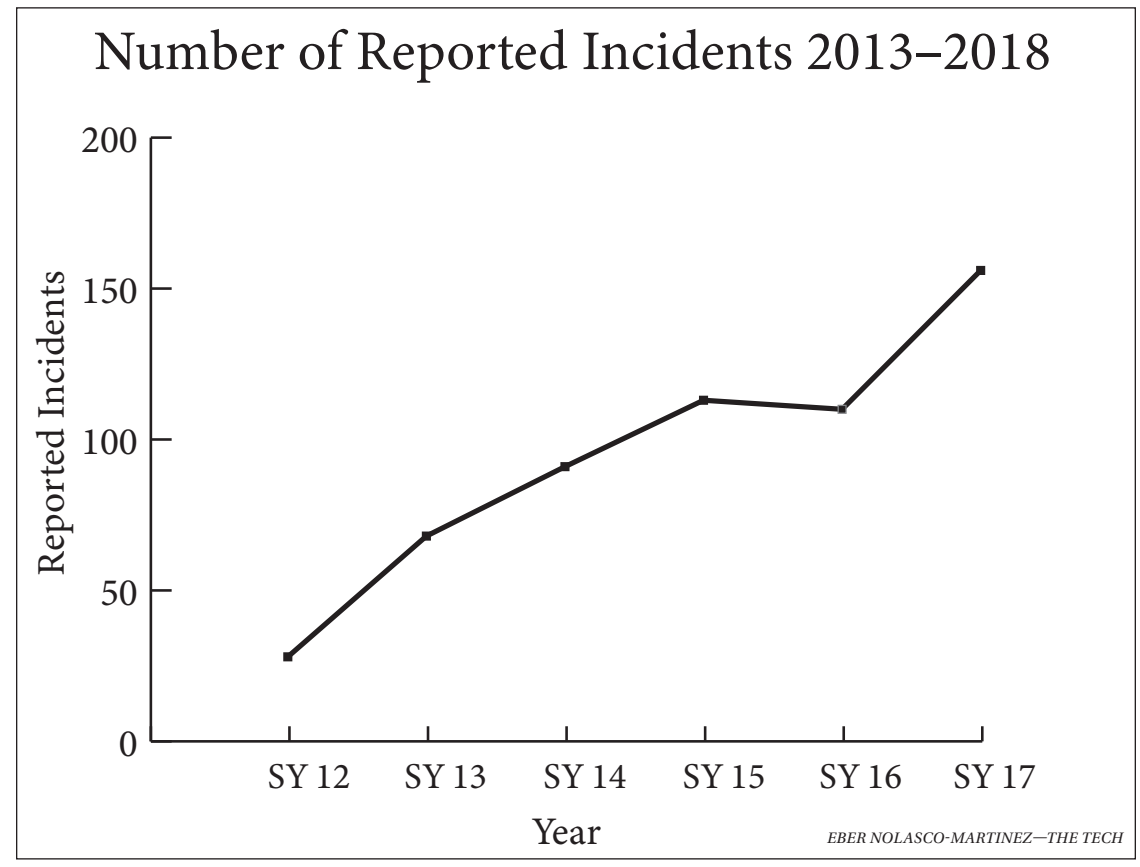
Historical increases in data collection

This decade, MIT has significantly increased efforts to gather data and improve our community's attitudes towards gender-based bias and violence. Data collected since 2012 has been included in tracking of gender-based policy violations. In 2014, MIT conducted the Community Attitudes on Sexual Assault survey to gather information about attitudes and prevalence of sexual assault. The following year, MIT created a Title IX office. Every year since creation, the office has produced a Title IX report, which focuses exclusively on student cases made known to the Title IX office— thereby surpassing the minimum requirements of Title IX, a law which prohibits gender-based discrimination in higher education.

Starting last academic year, the Title IX office was given responsibility for tracking prevalence of of all other bias incidents involving students and student groups, like religion, national origin, race, age, etc., and was renamed Title IX and Bias Response (T9BR). Later that semester, President Reif directed four offices to review how MIT handles faculty and staff sexual misconduct cases. According to an email from Human Resources (HR) to *The Tech*, these four offices will propose updates this academic year. Next semester, MIT will administer a campus climate survey to all students to track progress made combating sexual misconduct in the five years since the first survey.

In addition to increasing reporting efforts, MIT has created numerous initiatives to improve awareness regarding gender-based violence, like dispersing informational stickers about the reporting process, implementing and improving online trainings for faculty, staff, and students, delivering in-lab sexual harassment training for the chemistry department, and forming Violence Prevention and Response, a confidential office that supports students who experience gender-based violence.

In Spring 2018, MIT required online trainings for faculty and staff, in addition to undergraduates and graduate students. In an email to *The Tech*, T9BR reported that 99.7 percent of staff, 100 percent of incoming undergraduates, and 97.3 percent of incoming graduate students had completed the online trainings. Registration holds are being placed on graduate students who have not completed the training, so T9BR expects 100 percent completion soon.



EBER NOLASCO-MARTINEZ—THE TECH

Three years of Title IX data

One of the most obvious trends in the data is a more than 400 percent increase in the number of Title IX incidents reported since 2012. In an email to *The Tech*, T9BR attributes the increase in reports to "enhanced education and outreach."

Title IX offices nationwide have seen an increase in reports this past year, which they partially attribute to the #MeToo and #TimesUp movements increasing awareness about gender-based discrimination and improving equity in the workplace.

The T9BR office also saw an impact from the faculty and staff training on reporting data. T9BR said that the 42 percent increase in reports this year largely came from "department staff and faculty who informed Title IX about incidents students had reported to them," indicating that the online training which started January 2018 is "effectively explaining employee reporting obligations."

The data over the past three years also indicates an increase in reports of incidents directly involving faculty and staff, which could in part be due to increased awareness from training. The most recent report had 13 incidents where the complainant was faculty/staff, whereas the reports released in 2017 and 2016 had six and one incidents, respectively.

The data on sexual misconduct highlight the disproportionate impact it has on the undergrad community and demonstrate that cases of sexual misconduct extend beyond our individual campus.

Of cases in the past three years categorized as sexual misconduct — which includes actions such as non-consensual sexual penetration and sexual exploitation — 68 percent involved undergraduate complainants, but only 33 percent of respondents were identified as MIT undergraduates. A large fraction of respondents were not affiliated (28 percent) or were in the other/unknown category (27 percent). Title IX defines the complainant as the person to whom a policy violation was allegedly directed towards and the respondent as the person who allegedly committed the policy violation.

The second largest complainant category for sexual misconduct were non-affiliates, with more reports than faculty, staff and graduate students combined.

Of the respondents found responsible for non-consensual sexual penetration, four were expelled and one was suspended.

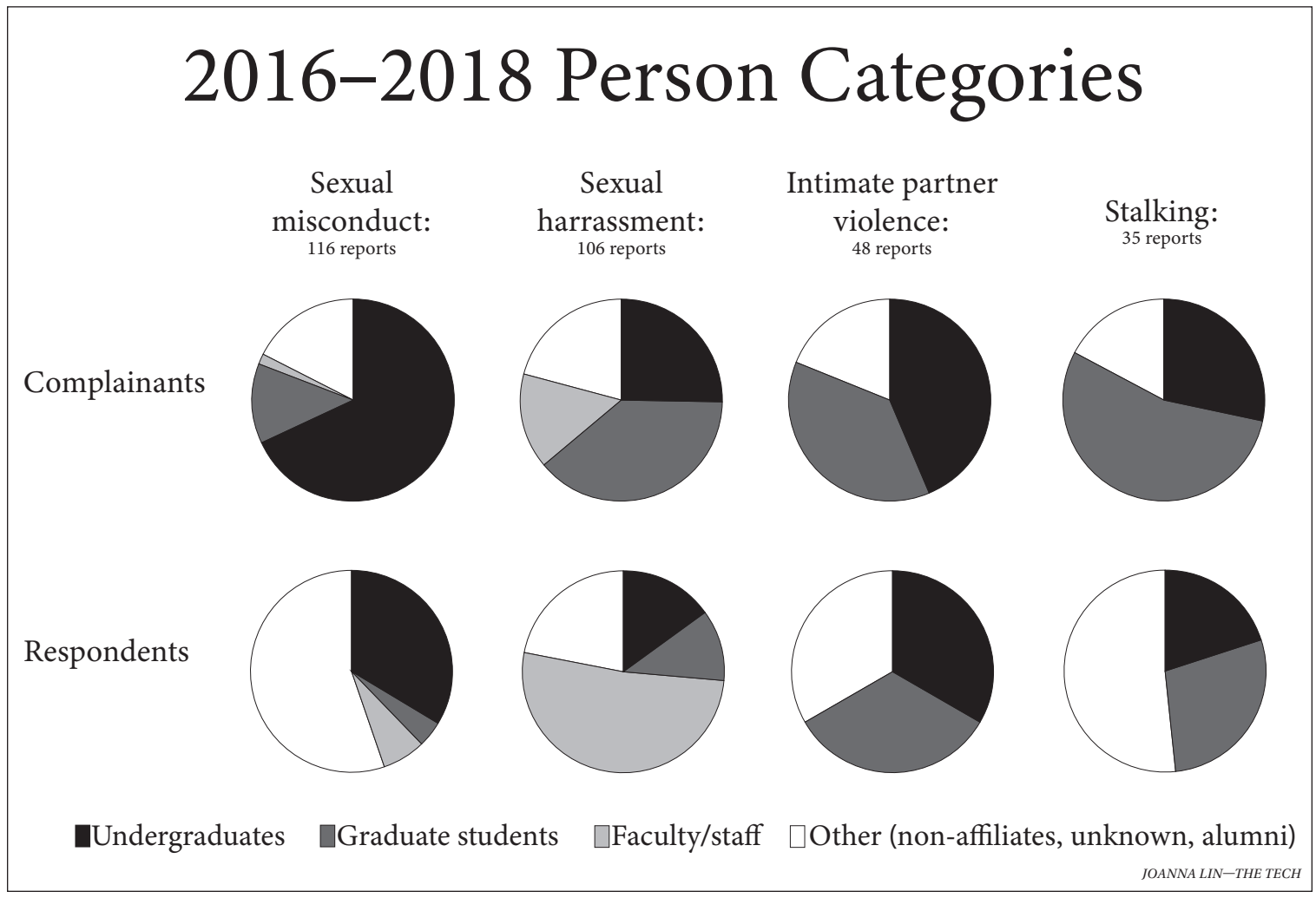
For sexual harassment, which includes unwelcome sexual comments that create a hostile work or living environment, the data show a different picture. Graduate students made up 39 percent of complainants, followed by undergraduates with 25 percent. Given that there are 52 percent more graduate students at MIT than undergraduates, assuming equal likelihoods of reporting, the rates of experiencing sexual harassment are probably similar between the two groups.

The respondent in 52 percent of the sexual harassment reports was identified as faculty or staff, with the other categories between 10–15 percent. This data indicates that respondent training on reducing harassment may be more impactful if designed with faculty and staff in mind.

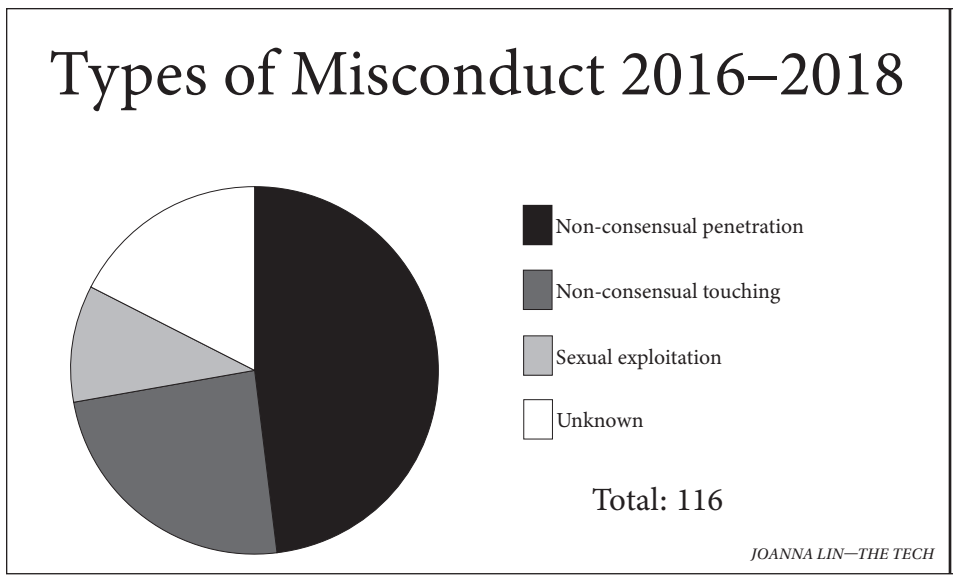
Reports of intimate partner violence, also called domestic violence, involved primarily undergraduates (44 percent) and graduate students (38 percent) as complainants, and approximately equal ratios of undergraduates, graduates, and non-affiliates as respondents.

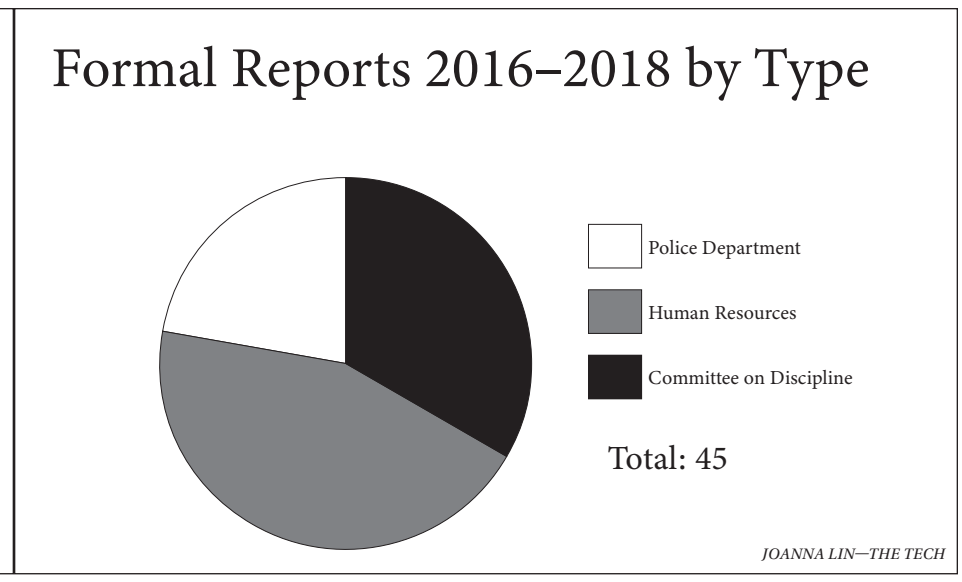
54 percent of stalking reports involved a graduate student being stalked, with 34 percent of respondents being not affiliated and 29 percent being graduate students.

It is important to note that the data presented here is only the data which has been reported to the Title IX office and has systematic bias in the frequency of what is and is not reported. For example, just because there are no reports of intimate partner violence or stalking involving faculty or staff over the three-year period does not mean none of MIT's 12,000 employees experienced either intimate partner



JOANNA LIN—THE TECH





violence nor stalking. The data just indicates that no intimate partner violence or stalking involving MIT employees was *reported* to the Title IX office. One way to decrease bias is to obtain higher reporting rates, which has been accomplished by the T9BR's recent efforts.

Yale, Princeton, Brown, and Stanford's reports all include retaliation data, which is not discussed in MIT's Title IX report.

Respondent consequences

The 2018 National Academies report "Sexual Harassment of Women," which evaluates the impacts of sexual harassment in academia and the workforce, states, "One central, and perhaps more obvious, way to prevent sexual harassment is for academic institutions to clearly demonstrate that they do not tolerate it." In an email to *The Tech*, Sarah Goodman G, Advocacy Chair of Graduate Women at MIT and former president of the GSC, wrote, "Publishing the T9BR report is an important step in demonstrating MIT's commitment to preventing gender-based violence and discrimination." In this report, MIT releases aggregated, anonymized data about the outcomes of formal investigations involving students in its Title IX cases.

Most cases reported to Title IX do not involve a formal investigation. Of the formal investigations in the past three years, a majority of investigations are handled by Human Resources or by the MIT Police, which MIT does not provide aggregate data about. However, the data about student respondents who went through formal investigations provide insights into how MIT treats cases of gender-based violence.

The three annual reports state the outcomes of students accused of violating MIT's Title IX policies. The reports aggregate data over multiple years to improve confidentiality.

From data in the most recent Title IX report, five of the 10 formal investigations related to non-consensual sexual penetration described in this year's report resulted in a not responsible verdict. Of the respondents who were found responsible, four were expelled and the other one was suspended. Stalking had the next most severe actions, with one student expelled and one suspended. Third most severe was non-consensual sexual contact, for which 80 percent of those responsible were suspended. Intimate partner violence, the last category with more than one investigation, mostly resulted in educational measures.

Though the MIT Title IX report does not mention the outcomes of investigations about faculty or staff, MIT does release information to the press about specific potential cases, like those involving the retired professor Walter Lewin, who was found responsible and whose videos were removed from OCW, and current faculty member Junot Diaz, about whom MIT reported that it had "not found or received information that would lead us to take any action to restrict Professor Diaz in his role as an MIT faculty member." When asked about what factors impact release of information, HR said that "decisions on releasing some information publicly is made on a case-by-case basis." When emailed about the factors that impact this decision, HR declined to respond. Since bias may exist in disclosing information about faculty decisions, these press releases provide only a limited and curated perspective when trying to understand how MIT handles cases with faculty/staff as respondents.

Unreleased data

Missing data prevents a complete understanding of the prevalence of gender-based discrimination and violence as well as MIT's response to it.

The National Academies report states, "For the people in an institution to understand that the institution does not tolerate sexual harassment, it must show that it does investigate and then hold perpetrators accountable in a reasonable timeframe." MIT's Title IX reports deviate from this recommendation by not releasing data about anonymized punishments to faculty or staff. Four peer institutions already release this data: Yale, Princeton, Brown and Stanford. Given that more gender-based formal investigations have gone through HR than through the Committee on Discipline in the last three academic years, this missing data makes up a large chunk of information on how MIT deals with gender-based cases, especially in cases with larger power imbalances.

When compared with peer-institutions' Title IX reports, MIT lumps faculty and staff into the same category, whereas other institutions, like Harvard, Yale, Princeton, and Stanford, separate data about faculty and staff. Yale and Stanford further differentiate postdocs from staff in their reports. However, Brown gave no affiliation distinction in its 2016–2017 report.

Yale, Princeton, Brown, and Stanford's reports all include retaliation data and findings, which is not discussed in MIT's Title IX report. T9BR told *The Tech*, "If the Title IX office receives reports of retaliation in a case involving students, it will be included in the report; no formal complaints of this nature have been received to date."

Columbia reports information on outcomes of investigations with student respondents, similar to MIT, but it also reports the timeliness of those investigations, which MIT does not report. Caltech does not produce aggregate annual Title IX data, in contrast to the other schools examined.

Path forward

In November 2017, President Rafael Reif released a letter to the community discussing the need to improve policies around sexual harassment. In it, Reif said, "I am conscious, however, that especially on questions around faculty and staff misconduct, we are not where we need to be." He added that he is charging four offices "to study our policies and practices, strengthen them where necessary, increase the community's awareness of them and develop a process so that findings of sexual misconduct are consistently handled in a way that balances fairness and transparency."

The tasks Reif mentioned, as outlined in the letter, do not explicitly mention openness of data. When *The Tech* asked HR about data availability of faculty/staff investigations, HR mentioned that the leaders of these offices would be proposing updates this academic year but did not explicitly mention any public data availability.

In an email to *The Tech,* Goodman wrote, "It's incredibly important, especially in the current political climate, that MIT continuously reaffirms its support for those who have faced sexual misconduct and/or acts of bias." She concluded, "It's hard to look at these numbers knowing that they represent some of the worst experiences of members of our community, but by becoming equipped with this knowledge, we can work towards creating a safe campus for everyone."

The opinions expressed by Sarah Goodman are her personal opinions and do not represent the opinions of Graduate Women at MIT as a whole.

Data in Title IX Reports

Aspect of report	MIT	Yale	Harvard	Princeton	Stanford	Brown
Affiliation	✓	✓	✓	✓	✓	
Separates faculty and staff		✓	✓	✓	✓	
Separates postdocs and staff		✓			✓	
Type of sexual misconduct	✓	✓	✓	✓	✓	✓
Student disciplinary outcomes	✓	✓		✓	✓	✓
Faculty disciplinary outcomes		✓		✓	✓	✓
Gender		✓	✓		✓	
Sexual orientation			✓			
Retaliation		✓		✓	✓	✓

JOANNA LIN—THE TECH

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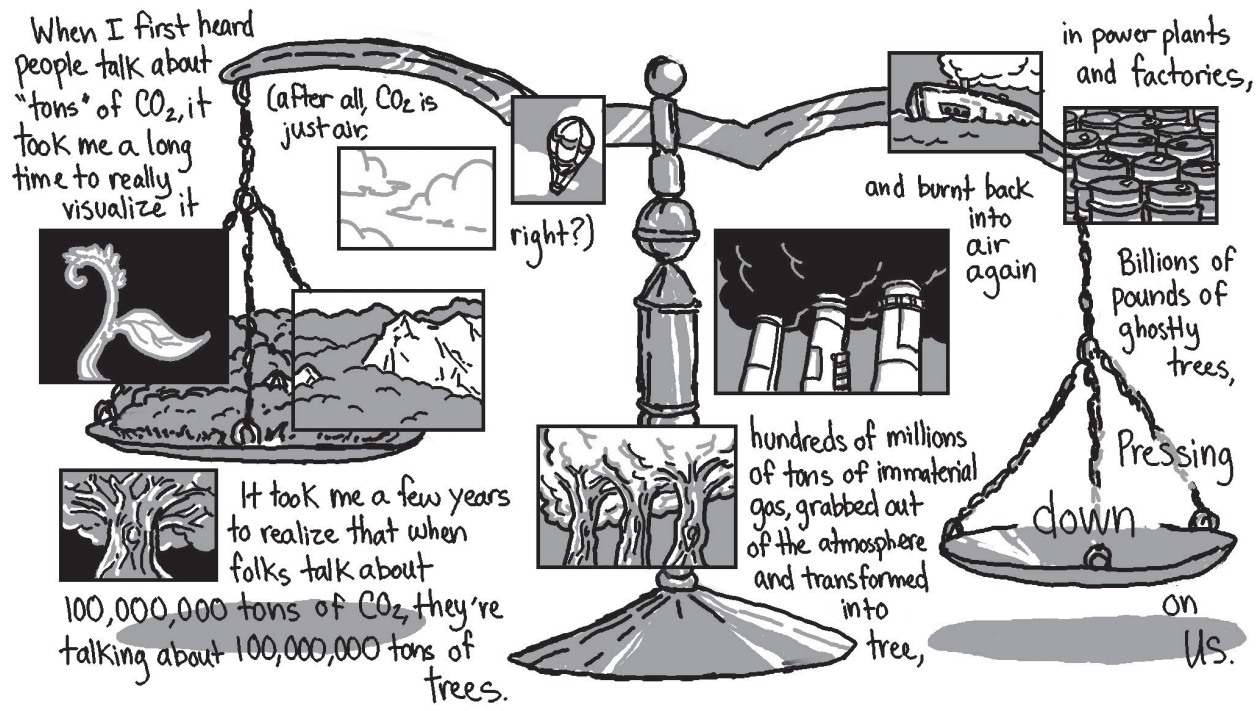
Tons by Mehitabel Glenhaber

Greenhouse Affect

by Mehitabel Glenhaber



Isometries of the Plane

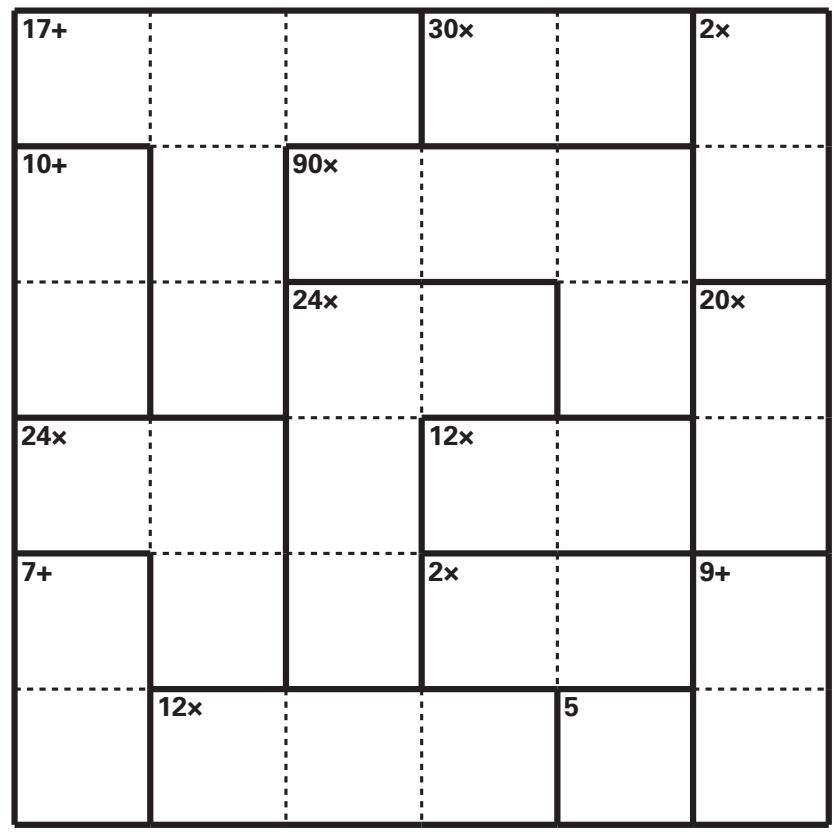
Solution, page 14

				8				
		8	9	7			6	
7	5		2		1	3		
8			3			6		1
	1						2	
9		3			7			4
		5	4		8		1	7
	4			1	2	5		
				5				

Instructions: Fill in the grid so that each column, row, and 3 by 3 grid contains exactly one of each of the digits 1 through 9.

Eulerian Tour

Solution, page 14



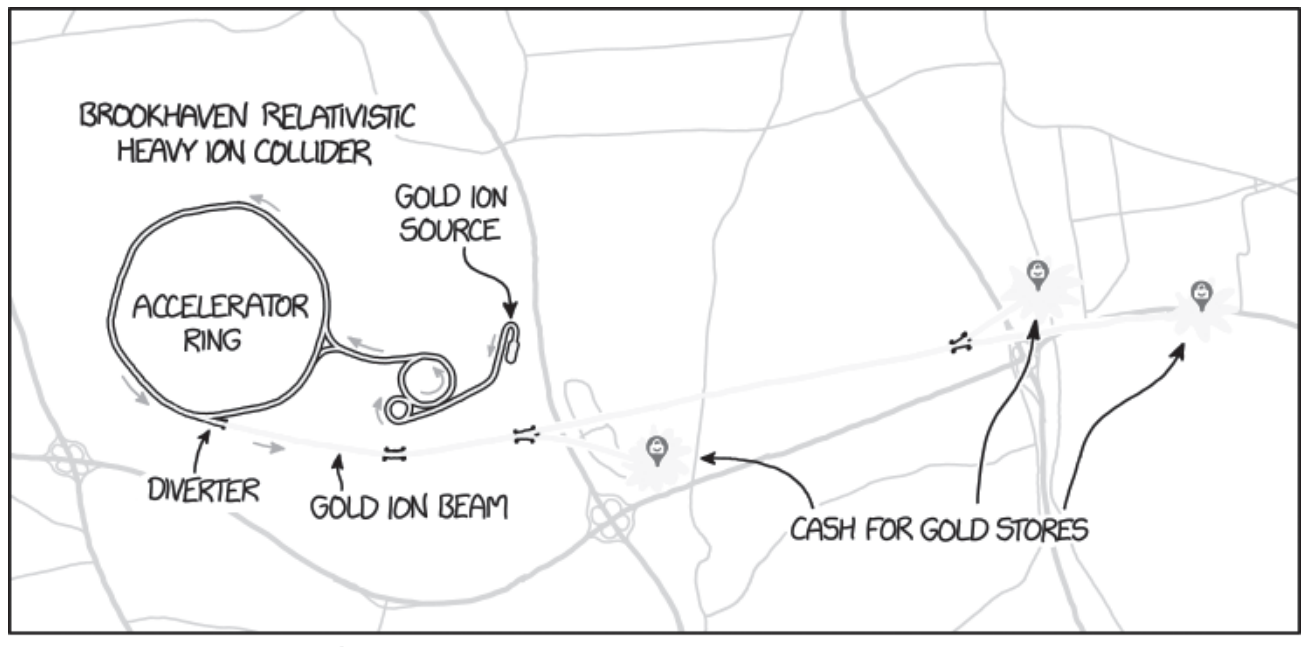
Instructions: Fill in the grid so that each column and row contains exactly one of each of the numbers 1–6. Follow the mathematical operations for each box.

xkcd

A WEBCOMIC OF ROMANCE, SARCASM, MATH, AND LANGUAGE

by Randall Munroe

[2007] Brookhaven RHIC



"Buddy, you trying to pull something? I can't buy this gold–all the electrons are missing. I could face serious charges!"

FUNFUNFUNF

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Solution to Sunrise

from page 12

8	2	9	7	1	3	5	6	4
1	5	3	2	6	4	7	8	9
4	6	7	9	8	5	3	2	1
3	9	6	5	4	7	8	1	2
5	8	2	3	9	1	6	4	7
7	4	1	6	2	8	9	3	5
2	7	8	4	5	6	1	9	3
9	1	5	8	3	2	4	7	6
6	3	4	1	7	9	2	5	8

Solution to Sunset

from page 12

4	3	6	2	1	5
2	1	4	6	5	3
5	4	1	3	2	6
6	5	2	4	3	1
3	2	5	1	6	4
1	6	3	5	4	2

Solution to Isometries

from page 13

1	3	6	5	8	4	9	7	2
4	2	8	9	7	3	1	6	5
7	5	9	2	6	1	3	4	8
8	7	2	3	4	5	6	9	1
5	1	4	8	9	6	7	2	3
9	6	3	1	2	7	8	5	4
6	9	5	4	3	8	2	1	7
3	4	7	6	1	2	5	8	9
2	8	1	7	5	9	4	3	6

Solution to Eulerian

from page 13

3	2	4	5	6	1
4	3	5	6	1	2
6	5	1	2	3	4
1	6	2	3	4	5
5	4	6	1	2	3
2	1	3	4	5	6

Solution to Steering

from page 12

T	O	L	L	■	M	A	S	T	S	■	R	O	D	S
E	R	I	E	■	O	C	T	E	T	■	I	H	O	P
R	E	E	F	■	S	T	R	A	Y	■	G	A	Z	E
M	O	S	T	■	L	I	A	R	■	T	H	R	E	E
■	■	■	T	R	E	V	I	■	I	N	T	E	N	D
G	R	A	H	A	M	■	G	E	T	T	O	■	■	■
R	I	P	E	N	■	C	H	A	R	■	N	E	C	K
I	C	E	D	■	P	A	T	S	Y	■	T	R	U	E
P	E	S	O	■	A	S	S	T	■	S	H	A	R	E
■	■	■	O	P	R	A	H	■	D	I	E	S	E	L
S	E	C	R	E	T	■	O	N	E	P	M	■	■	■
T	A	L	O	N	■	T	O	O	N	■	O	W	L	S
A	S	A	P	■	P	A	T	I	O	■	N	A	P	A
M	E	R	E	■	C	R	E	S	T	■	E	G	G	S
P	L	A	N	■	S	P	R	E	E	■	Y	E	A	H

MOVIE REVIEW

Alice in Wonderland meets *The Nutcracker*

Disney's modern take on yet another classic tale

★★☆☆☆

The Nutcracker and the Four Realms

Directed by Lasse Hallström and Joe Johnston

Screenplay by Ashleigh Powell

Starring Mackenzie Foy, Jayden Fowora-Knight, Helen Mirren, Keira Knightley, Morgan Freeman

Rated PG, Now Playing

By Nathan Liang and Kathryn Tso

Disney's *The Nutcracker and the Four Realms* takes the traditional tale of *The Nutcracker* and tries to put its own original take on it. Clara Stahlbaum (Mackenzie Foy) is the brilliant middle child in a family that is clouded by grief due to her mother's passing. It's Christmas Eve, a holiday that used to bring the family together, but now brings feelings of melancholy as each member remembers the impact their mother, Marie Stahlbaum (Anna Madeley), had on their lives. Trying to keep the family together, Mr. Stahlbaum (Matthew Macfadyen) prepares his children for Drosselmeyer's (Morgan Freeman) annual Christmas Eve party. During Drosselmeyer's gift-giving sequence to the children attendees, Clara finds a string that ultimately leads to one of her mother's greatest inventions: a world filled with children's playthings brought to life.

Our expectations were already low after watching the trailer, and unfortunately, they weren't exceeded. Overall, it is a classic, feel-good movie. A dysfunctional family is brought together after the daughter takes a life-changing adventure and sees the error in her ways. The costume and world design is beautiful in the way fantasy movies typically are. You are awed by the beauty of the world at hand and the unique eccentricities that greet your eye upon first glance.

However, the plot is not very complicated and mostly predictable. Even the exposition of the new world is typical: a girl is in awe of a new place but soon meets the evil villain before she's rescued by a heroic prince and taken to a castle where she learns the backstory of this mysterious land. She then is somehow "The Chosen One" and is expected to lead a quest before returning home and realizing how much she appreciates her family. Its ending makes you feel a little warm inside, but there are better feel-goods out there.

Another thing to note are the allusions to pop culture. There are glances at things like *Wizard of Oz* and *Fantasia*, but the more obvious ones are from where this movie takes its primary inspiration: *The Nutcracker and the Mouse King* and *The Nutcracker* ballet. Some are cute, such as the introduction of the different realms, but most things seemed in need of proper execution. For instance, the lack of world-building in the movie leaves much to be desired. Clara probably spends at most fifteen seconds of screen time in the Realm of Sweets, the Realm of Flowers, and the Realm of Snowflakes receiving gifts of sweets and flowers from each realm's inhabitants. And that's it. Boom. Done. We never again see what might happen to the other realms or even how they contribute to the greater balance of this carefully crafted world by Marie Stahlbaum.

Then there's the soundtrack. We really wish the movie could have integrated more of "The Nutcracker Suite" into the film. Perhaps motifs from "The Nutcracker Suite" are prevalent throughout the soundtrack, but they're subtle enough to not even be noticed; and whenever the motifs are blatantly obvious, it's really just the same few recognizable measures of music that are played over and over again.

There's also the Nutcracker (Jayden Fowora-Knight), which brings in the problem of character development. Every character in the film embodies a classic archetype, but doesn't reach far from the basics. Philip the Nutcracker is your loyal guardian. Cavalier (Omid Djalili) and Harlequin (Jack Whitehall) are your Dumb and Dumber, and basically only serve as lame comedic relief. Drosselmeyer is the sagely guide for the insecure, emotionally challenged protagonist, Clara, who (surprise!) has the inner strength to fix the broken world. In particular, we actually found Clara's self-esteem quite confusing. There are moments where she's torn by the loss of her mother and begs the spirit of her mother to give her strength to continue doing the right thing. Then, in the very next scene, she'll be suited up like a war general, leading a legion of soldiers into the Fourth Realm to combat Mother Ginger (Helen Mirren). Where is the connecting development between these two sequences? Does Clara's radical self-esteem just swing left and right for the convenience of the plot? Unfortunately, that seems to be the case.

Like most other movies these days, there just didn't seem to be a point to this film besides to make some money and to see Morgan Freeman in an eyepatch. There were no actors that stood out in particular. It was only while writing this review that we discovered the lead actress is the same girl as the one who played 10-year-old Murph in *Interstellar*, and it was disappointing to realize that this movie squandered her potential. There were many stiff scenes, especially in the beginning, which made the relationships between characters feel forced and unnatural. Ironically, this actually works in the beginning when Clara has a conflict with her father, but not so much when she's meeting new people and finding a potential new love interest. If you want to see Mackenzie Foy at her peak (so far), we'd definitely recommend watching *Interstellar* instead.

The saddest part for us is the fact that Disney has the capability to make so many great films, yet this is the content they decide to produce.

COURTESY OF WALT DISNEY STUDIOS

Clara (Mackenzie Foy) looks in awe at her mother's kingdom with Hawthorne (Eugenio Derbez), Shiver (Richard E. Grant), and Sugar Plum (Keira Knightley).

INTERVIEW

A dish beyond imagination: Clover Food Lab's Meatball Sandwich

Take a bite into Clover's environmentally-friendly and delicious meatball sandwich that's meat-free

By Alana Chandler

Melting Arctic sea ice, cute white bears dying, a world where grasslands are replaced with Atlantis… These are the tropes of global warming fed to us through the occasional sad Facebook video. As we sit in our air-conditioned rooms, perhaps munching out of a styrofoam takeout container, we might look out our windows and see the hopeful green of single tree, urbanly planned to sprout at conveniently aesthetic intervals. *Leaves still exist, so that means that Earth is still functioning, right? I haven't died of starvation yet, so…* And on with the day.

But this month brought not another picture of a starving polar bear, but something more jarring: a warning from the Intergovernmental Panel on Climate Change that we have as little as 12 years to act on climate change. If we do not cut our global greenhouse emissions by 45 percent from 2010 levels, our planet's health could plummet to extreme floods, droughts, wildfires, and food shortages.

Clover Food Lab

Vegetarian Fast Casual, $

Various locations in Boston area including:

5 Cambridge Center Cambridge, MA

Monday–Saturday 7 a.m.–11p.m., Sunday 9 a.m.–8 p.m.

Ayr Muir had a premonition about the relationship between corporate practices and the environment back when he was a materials science student at MIT in 2001. "I read an article about food and the environment, and that was the first time I started thinking about those things being connected." In fact, 15 percent of greenhouse gas emissions are attributed to animal agriculture. According to the UN Food and Agriculture Organization, growing plants for livestock production consumes 25 percent of the world's fresh water and occupies nearly half of the world's land, a great threat to biodiversity. "I started wondering if we could figure out how to feed people food that was vegetables, even to those who wouldn't normally eat vegetables otherwise," said Muir. That's when he thought of starting his own environmentally-focused restaurant business.

Today, Muir is the CEO of Clover Food Labs, a popular veggie-based fast casual restaurant chain in the Boston area. Unlike other fast food chains, Clover sells no products with meat and aims to motivate customers to eat vegetables instead. While most restaurants serve the same menu all year round, Clover shapes their menu off of what is available in local farms. Menu items are inspired from cuisines across the globe, ranging from Japanese sweet potato platters piled high with shiso salad and crispy fried tempura sesame seeds to South Indian-inspired spicy coconut lentil soup topped with olive oil and cilantro. While the unique flavors and textures of vegetables stand out in these dishes, one item stands out: the Impossible Meatball Sandwich.

Unlike the other items at Clover that celebrate plants in their natural form, the Impossible Meatball Sandwich turns the inconceivable to reality. The meatball is made using something called Impossible Meat, a vegan meat substitute. Yet unlike a veggie burger that crumbles upon the first bite or fake bacon that resembles the texture of a tablecloth, the Impossible meatball "tastes like beef. It's really a crazy thing," says Muir.

How is this magic possible? Scientists and culinary experts studied the molecular mechanisms that underlie the deliciousness of meat—flavor, of course, but also scent, texture, and the transformation when prepared with heat. While the meatball is mainly composed of wheat, coconut, and potato, the secret ingredient is something called "heme," derived from soybeans. Heme is an iron-containing molecule that occurs naturally in every cell of every animal and plant, especially abundant in animal muscle, giving the vegan burger its meatiness. It's also what causes the Impossible Meat to turn from red to brown when heated. Impossible Meat requires about 75 percent less water and 95 percent less land than conventional ground beef, as well as generating approximately 87 percent lower greenhouse gas emissions. Cue applause.

Clover folds the Impossible Meat with garlic, parsley, milk-soaked pita, egg, and then bakes the meatballs off in the oven for a crispy exterior. The meatballs are then drenched in a rich tomato sauce, sprinkled with Pecorino cheese, and served in a soft pita. The sandwich is more expensive than other items on their menu, costing about $13 dollars per sandwich, because of the cost of the Impossible Meat. "Even though we charge a lot of money for those sandwiches, we make less of a profit than we do on any others. Really cheap ground beef that you get in most fast food chains is 2 dollars-a-pound or so. Impossible meat is about 11 dollars-a-pound, which is double the cost of grass-fed beef," says Muir. Yet both he and customers believe it's worth the bucks. For Clover, it's an opportunity to get meat-lovers to realize the existence of delicious, meat-free alternatives; the sandwich acts as a gateway "drug" into Clover's other vegetable-centric dishes. According to Muir, "a lot of customers tell us it's the best meatball that they've ever had."

If you would like to offer recipe ideas or other suggestions to Clover, visit CloverHUB at 1075 Cambridge Street on Tuesdays from 3 p.m. to 4 p.m. to participate in their open menu development meeting.

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